REMARKS

Claims 47-49, 52, 53, 60 and 61 are pending in the instant application. Reconsideration of the claims in light of the amendments, presented above, and the remarks presented below is respectfully requested.

Rejection under 35 U.S.C. § 102

Claims 47-49 and 51-53 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Meade et al., WO/95/15971. In particular, the Examiner asserts that Meade teaches methods for the site specific addition of electrodes to nucleic acids, including nucleic acid analogs, in a variety of positions. *See e.g.,* page 20, lines 18-20; Fig. 4A; page 20, lines 30-34; page 21, line 1; page 24, line 16; page 22, lines 7-9; page 24, line 18; and page 22, lines 17-20. The Examiner also contends that the disclosed attachment of electrodes to nucleic acid analogues can be characterized as a "complex covalent structure" wherein the electrode is effectively covalently attached to the α-carbon of a nucleic acid analogue.

The present claims are directed to the modification of peptide nucleic acids in which an ETM is covalently attached to an α-carbon (*See e.g.,* Figs. 31A and 31B) or base of a monomeric subunit. As distinguished from the linkages disclosed in Meade, the specific linkages of the present invention are characterized by the attachment of an ETM to a specific α-carbon or base within a monomeric subunit of a peptide nucleic acid, and thus do not participate in the "complex covalent structures" described by the Examiner since such complex structures require more than a single monomer.

As pointed out previously, a species (in this case, attachment to the α-carbon of a peptide nucleic acid monomer) can be patentable over a genus (e.g. an ETM attached to a nucleic acid analogue such as a peptide nucleic acid). *See, In re Duel*, 34 USPQ2d 1210, 1215 (Fed Cir. 1995) (general knowledge of cDNA molecules based on known protein sequence (genus) does not render specific cDNA molecules (species) obvious).

It is well settled law that in order to anticipate a claim, a single prior art reference must expressly or inherently describe each and every element set forth in the claim. *See Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051 (Fed. Cir. 1987). Moreover, "[t]he identical invention must be shown in as complete a detail as is contained in the claim" *See* M.P.E.P. 2131. As stated by the Federal Circuit, "for a prior art reference to anticipate in terms

of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference." *See In re Bond*, 15 USPQ2d 1566.

As discussed above, Meade does not explicitly disclose linkages between ETMs and α-carbons or bases within monomeric subunits of peptide nucleic acids. Accordingly, Applicants respectfully request withdrawal of the instant rejection.

Claims 47-49 and 51-53 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Megerle et al., U.S. Patent No. 5,874,046. Megerle discloses the same techniques taught in Meade. Column 1, lines 56-65 and Column 4, lines 47-61.

The present invention is summarized above.

The arguments set forth above for the Meade reference apply equally to Megerle. Like Meade, Megerle does not disclose linkages between ETMs and α-carbon or base positions within the monomeric subunits of peptide nucleic acids, but instead requires the complex covalent structures only found in polymers. Applicants accordingly respectfully request that the 35 U.S.C. § 102(e) rejection of claims 47-53 be withdrawn.

Rejections Under 35 U.S.C. § 103(a)

Claims 47-49, 51, 53, 60 and 61 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mirkin et al., U.S. Patent No. 6,361,944. In particular, the Examiner asserts that Mirkin teaches nanoparticles with attached oligonucleotides, that these oligonucleotides may be modified by the addition of ferrocene (column 34, lines 2-32), and suggests the substitution of peptide nucleic acids for the disclosed oligonucleotides (column 42, lines 4-14). However, Mirkin only describe the addition of ferrocene to the nanoparticles in three ways: (1) as part of a ferrocene-derivatized phosphoramidite which would "end-label" an attached oligonucleotide (citing, Mucic et al., *Chem. Commun.*, 55 (1996); Eckstein, ed., in *Oligonucleotides and Analogues*, 1st ed., Oxford University, New York, NY (1991)); (2) as a part of a polymer bound to the nanoparticle separately from the oligonucleotide (citing, Watson et al., *J. Am. Chem. Soc.*, 121, 462-463 (1999)); or (3) the ferrocene-modified polymer of (2) is employed as a portion of a co-polymer which also included the oligonucleotide (citing, Moller et al., *Bioconjugate Chem.*, 6, 174-178 (1995)). None of these methods of ferrocene incorporation teach or suggest attachment at the α-carbon or a base position within a monomeric subunit of peptide nucleic acids.

The instant invention is described above.

To establish a *prima facie* case of obviousness the prior art reference (or references when combined) must teach or suggest all the claim limitations. In addition, the teaching or suggestion to make the claimed combination must be found in the prior art, and not based on applicant's disclosure. *See*, *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) M.P.E.P. §2143.

As discussed above, Mirikin does not teach or suggest attachment of an ETM at the α-carbon or at a base position within a monomeric subunit of peptide nucleic acids, but only through a "complex covalent structure" in polymeric forms. Accordingly, withdrawal of the instant rejection is respectfully requested.

CONCLUSION

Applicants submit that the application is in form for allowance and early notification of such is requested. If the Examiner believes that any unresolved issues may be disposed of by telephone, he is respectfully requested to call the undersigned at (415) 781-1989. This paper is filed under 37 C.F.R. section 1.34(a).

Respectfully submitted,

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